

What is Claimed is:

1. A reactive coating composition for the stabilization of a heavy metal contained in a paint layer on a surface, said coating composition comprising:

- 5 a) at least about 3 weight percent of a heavy metal stabilizing agent;
- b) at least about 1 weight percent of a permeability enhancing agent adapted to increase the permeability of the heavy metal stabilizing agent into the paint layer; and
- 10 c) the balance comprising a vehicle including at least a binder, wherein said coating composition adheres to said paint layer and forms a complex heavy metal compound having reduced leachability.

2. A reactive coating composition as recited in Claim 1, wherein said heavy metal stabilizing agent is selected from the group consisting of flocculants, coagulants, precipitants, complexing agents, epoxy agents and adsorbents.

15 3. A reactive coating composition as recited in Claim 1, wherein said heavy metal stabilizing agent is selected from the group consisting of phosphate compounds, silicate compounds, carbonate compounds and sulfide compounds.

4. A reactive coating composition as recited in Claim 1, wherein said heavy metal stabilizing agent comprises a phosphate compound.

20 5. A reactive coating composition as recited in Claim 1, wherein said heavy metal stabilizing agent comprises triple superphosphate.

6. A reactive coating composition as recited in Claim 1, wherein said heavy metal stabilizing agent is in the form of a solid dispersed in said coating composition.

25 7. A reactive coating composition as recited in Claim 6, wherein said heavy metal stabilizing agent comprises particles of a phosphate compound having an average particle size of not greater than about 250 μm .

8. A reactive coating composition as recited in Claim 1, wherein said heavy metal stabilizing agent is in the form of a liquid dispersed in said coating composition.

30 9. A reactive coating composition as recited in Claim 1, wherein said coating composition comprises from about 5 weight percent to about 60 weight percent of said heavy metal stabilizing agent.

10. A reactive coating composition as recited in Claim 1, wherein said coating composition comprises from about 20 to about 40 weight percent of said heavy metal stabilizing agent.

11. A reactive coating composition as recited in Claim 1, wherein said permeability enhancing agent comprises sodium hydroxide.

12. A reactive coating composition as recited in Claim 1, wherein said permeability enhancing agent comprises N-Methyl-2-Pyrrolidone.

13. A reactive coating composition as recited in Claim 1, wherein said permeability enhancing agent comprises ethyl lactate.

10 14. A reactive coating composition as recited in Claim 1, wherein said permeability enhancing agent comprises methyl ethyl ketone.

15 15. A reactive coating composition as recited in Claim 1, wherein said permeability enhancing agent comprises dimethyl sulfoxide.

16. A reactive coating composition as recited in Claim 1, wherein said coating composition comprises at least about 3 weight percent of said permeability enhancing agent.

17. A reactive coating composition as recited in Claim 1, wherein said coating composition comprises from about 5 weight percent to about 25 weight percent of said permeability enhancing agent.

20 18. A reactive coating composition as recited in Claim 1, wherein said coating composition comprises from about 5 weight percent to about 10 weight percent of said permeability enhancing agent.

19. A reactive coating composition as recited in Claim 1, wherein said vehicle further comprises water.

25 20. A reactive coating composition as recited in Claim 1, wherein said vehicle is a latex-based paint composition.

21. A reactive coating composition as recited in Claim 1, wherein said coating composition has a VOC content of not greater than about 250 g/l.

30 22. A reactive coating composition as recited in Claim 1, wherein said binder is selected from the group consisting of alkyd resin, polyurethane, acrylic resin, polyvinyl acetate, ethylene glycol and mixtures thereof.

23. A reactive coating composition as recited in Claim 1, wherein said coating composition further comprises a pigment.

24. A reactive coating composition for the stabilization of a heavy metal contained in a paint layer on a surface, said coating composition comprising:

- 5 a) from about 5 weight percent to about 60 weight percent of a heavy metal stabilizing phosphate compound;
- b) from about 5 weight percent to about 25 weight percent of a permeability enhancing agent comprising N-Methyl-2-Pyrrolidone; and
- c) the balance comprising a vehicle including at least a binder, wherein said coating composition adheres to said paint layer and forms a complex heavy metal compound having reduced leachability.

10 25. A reactive coating composition as recited in Claim 24, wherein said phosphate compound comprises triple superphosphate.

26. A reactive coating composition as recited in Claim 24, wherein said vehicle further comprises water.

15 27. A reactive coating composition as recited in Claim 24, wherein said coating composition comprises from about 10 to about 40 weight percent of said phosphate compound.

20 28. A reactive coating composition as recited in Claim 24, wherein said coating composition comprises from about 5 weight percent to about 10 weight percent of said N-Methyl-2-Pyrrolidone.

29. A reactive coating composition as recited in Claim 24, wherein said vehicle is a latex-based paint composition.

30. A reactive coating composition as recited in Claim 24, wherein said binder is selected from the group consisting of alkyd resin, polyurethane, acrylic resin, polyvinyl acetate, ethylene glycol and mixtures thereof.

25 31. A reactive coating composition as recited in Claim 24, wherein said coating composition further comprises a pigment.

32. A method for making a reactive coating composition adapted to react with a heavy metal to form a complex heavy metal compound with reduced leachability, comprising the steps of:

- a) providing a water-based paint composition;
- b) adding at least about 3 weight percent of a heavy metal stabilizing agent to said water-based paint composition; and
- c) adding at least about 1 weight percent of a permeability enhancing agent to said water-based paint composition.

33. A method as recited in Claim 32, wherein said water-based paint composition is a latex paint composition.

34. A method as recited in Claim 32, wherein said heavy metal stabilizing agent comprises triple superphosphate.

35. A method as recited in Claim 32, wherein said triple superphosphate has a particle size of not greater than about 250 μm .

36. A method as recited in Claim 32, wherein said heavy metal stabilizing agent is added in an amount of from about 10 weight percent to about 40 weight percent.

37. A method as recited in Claim 32, wherein said permeability enhancing agent is selected from the group consisting of sodium hydroxide, N-Methyl-2-Pyrrolidone, ethyl lactate, methyl ethyl ketone, dimethyl sulfoxide and mixtures thereof.

38. A method as recited in Claim 32, wherein said permeability enhancing agent comprises N-Methyl-2-Pyrrolidone.

39. A method as recited in Claim 32, wherein said permeability enhancing agent is added in an amount of from about 5 weight percent to about 25 weight percent.

40. A method as recited in Claim 32, further comprising the step of adding additional water to said water-based paint composition.

41. A method for the stabilization of a heavy metal contained in a paint layer, comprising the steps of:

- a) providing a reactive coating composition comprising a heavy metal stabilizing agent, a permeability enhancing agent and a binder;
- b) applying said reactive coating composition to a paint layer on a structure; and
- c) leaving said reactive coating composition on said structure for a period of time sufficient to stabilize at least a portion of heavy metals contained in said paint layer.

10 42. A method as recited in Claim 41, wherein said heavy metal is selected from the group consisting of lead, barium, silver, arsenic, cadmium, mercury, antimony, selenium and chromium.

43. A method as recited in Claim 41, wherein said heavy metal comprises lead.

15 44. A method as recited in Claim 41, wherein said heavy metal stabilizing agent is selected from the group consisting of flocculants, coagulants, precipitants, complexing agents, epoxy agents and adsorbents.

20 45. A method as recited in Claim 41, wherein said heavy metal stabilizing agent is selected from the group consisting of phosphate compounds, silicate compounds, carbonate compounds and sulfide compounds.

46. A method as recited in Claim 41, wherein said heavy metal stabilizing agent comprises a phosphate compound.

47. A method as recited in Claim 41, wherein said heavy metal stabilizing agent comprises triple superphosphate.

25 48. A method as recited in Claim 41, wherein said coating composition comprises from about 5 to about 60 weight percent of said heavy metal stabilizing agent.

30 49. A method as recited in Claim 41, wherein said permeability enhancing agent is selected from the group consisting of sodium hydroxide, N-Methyl-2-Pyrrolidone, ethyl lactate, methyl ketone, dimethyl sulfoxide and mixtures thereof.

50. A method as recited in Claim 41, wherein said permeability enhancing agent comprises N-Methyl-2-Pyrrolidone.

51. A method as recited in Claim 41, wherein said reactive coating composition comprises from about 5 to about 25 weight percent of said permeability enhancing agent.

52. A method as recited in Claim 41, further comprising the step of removing said paint layer from said structure.

53. A method as recited in Claim 52, wherein said removing step comprises removing said paint layer using an abrasive.

10 54. A method as recited in Claim 52, wherein said removing step comprises removing said paint layer by scraping.

55. A method as recited in Claim 41, further comprising the step of:

(d) applying a paint layer over said reactive coating composition.

56. A method for the treatment and disposal of a structure having a heavy metal containing paint layer on the structure, the method comprising the steps of:

a) applying a reactive coating composition to said paint layer, said reactive coating composition comprising:

5 i) a heavy metal stabilizing agent, and

ii) a permeability enhancing agent adapted to increase the permeability of said heavy metal stabilizing agent into said paint layer;

10 b) leaving said reactive coating composition on said paint layer for a period of time sufficient to stabilize at least a portion of heavy metals contained in said paint layer and to enable said reactive coating composition to dry and form a treated structure comprising a treated paint layer and a reactive coating layer; and

15 c) disposing said treated structure comprising said treated paint layer in a landfill, wherein the leachability of heavy metals contained in said treated paint layer is reduced.

57. A method as recited in Claim 56, wherein said paint layer is disposed on a wooden structure.

58. A method as recited in Claim 56, wherein said paint layer is disposed on concrete.

20 59. A method as recited in Claim 56, wherein said heavy metal stabilizing agent comprises a phosphate compound.

60. A method as recited in Claim 56, wherein said heavy metal stabilizing agent comprises triple superphosphate.

25 61. A method as recited in Claim 56, wherein said heavy metal stabilizing agent comprises a phosphate compound in an amount of from about 10 weight percent to about 40 weight percent.

62. A method as recited in Claim 56, wherein said permeability enhancing agent is selected from the group consisting of sodium hydroxide, N-Methyl-2-Pyrrolidone, ethyl lactate, methyl ethyl ketone, dimethyl sulfoxide and mixtures thereof.

30 63. A method as recited in Claim 56, wherein said permeability enhancing agent comprises N-Methyl-2-Pyrrolidone.

64. A method as recited in Claim 56, wherein said coating composition comprises from about 5 weight percent to about 25 weight percent of said permeability enhancing agent.

65. A method for the treatment of a structure having heavy metals on a surface of the structure, comprising the steps of:

a) applying a reactive coating composition to said surface, said reactive coating composition comprising:

- 5 i) a heavy metal stabilizing agent; and
 ii) a vehicle including a binder; and

b) leaving said reactive coating composition on said surface for a period of time sufficient to stabilize at least a portion of heavy metals contained on said surface and to enable said reactive coating composition to dry and form a treated structure
10 wherein the leachability of heavy metals is reduced.

66. A method as recited in Claim 65, wherein said surface comprises a material selected from concrete, brick and wood.

67. A method as recited in Claim 65, wherein said surface comprises barren concrete.

15 68. A method as recited in Claim 65, wherein said heavy metal stabilizing agent comprises a phosphate compound.

69. A method as recited in Claim 65, wherein said vehicle comprises a paint composition.